Let us always remember this is a complex disease. We cannot neglect the basic orthopedic principles of protection from deformity, lest we be left, when the remission occurs, with severe secondary manifestations, which make the respite of small functional value.

It is possible that we may have to come to the institutional care of a large number of these afflicted, as has been so well exemplified by the Swedish National Hospital for Rheumatism, before proper care can be administered.

I agree with Doctor Peers, that in the meantime, by gradually strengthening our laboratory procedures from the standpoint of diagnosis and prognosis, we can hope for a large measure of remission.

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ROBERT T. POTTENGER, M. D. (65 North Madison Avenue, Pasadena).—Doctor Peers' paper illustrates the meaning of the definition given by the American Committee for the Control of Rheumatism, that arthritis is "a generalized disease with joint manifestations." Physiologic disturbances occur not only in the skeletal system, but also in the circulatory system, the digestive tract, the nervous system, and the general metabolism.

Doctor Peers has again shown that a delay in the removal of sugar from the blood can frequently be demonstrated in all types of arthritis. Therapeutic deductions from laboratory data are difficult of evaluation when each procedure is only one factor in a general program. When laboratory observations suggest a radical change in the diet, the effects are particularly difficult of evaluation; as the resultant changes in the physiology may be due to additional factors introduced in the new diet, rather than to the correction of the hypothetical abnormality. This observation of an apparent weakness in the mechanism of sugar metabolism (which is shown by the delay in removing sugar from the blood) gave rise to the use of a "low caloric diet," and also a "low carbohydrate diet" in the treatment of arthritis. In practice these may amount to the same thing, as a low caloric diet must still have adequate amounts of protein which becomes largely of animal origin with a consequent increase of the fat content. The dehydrating effect of this diet was noticed, and Pemberton, in 1934, called attention to the apparent therapeutic value of this effect.

As you know, the average diet contains ten or more times as much carbohydrate and protein combined as fat, while a ketogenic diet contains four times as much fat as protein and carbohydrate. A low caloric diet might contain three times as much protein and carbohydrate as fat, and if three tablespoonfuls of cod-liver oil were given each day, twice as much. My observations show that a dehydrating effect begins when there is about two times as much protein and carbohydrate as fat in the diet, and the loss continued so that when the fat has been increased to one and one-half times the combined protein and carbodrate the loss of water amounts to three or four pounds. The water loss observed may be due to the reduction in the carbohydrate intake, or the metabolic effect of the fat, or to other factors; since the diet has been altered not only in a reduction in the number of calories and the proportion of fat, carbohydrate, and protein, but also in the mineral and vitamin content, as vegetables make a large portion of the bulk of the diet. Furthermore, the water loss may simply be the result of a favorable alteration in the metabolism rather than the cause of it.

After a scientific prescription of a diet there remains the variable of the patient. Unfavorable results from a prescribed diet may be due to the patient's failure to eat the foods thereon, or perhaps more rarely to assimilate them. Several patients who were doing poorly on a low carbohydrate diet were found, on weighing their food intake, to be eating about 25 grams of protein a day, and this largely of vegetable origin. Simply increasing the protein intake to about 60 grams was followed by clinical improvement.

The importance of particular factors in the diet can be more readily evaluated if the whole diet is studied in respect to all the food factors in at least as exact terms as the erratic method of weighing foods will allow. If dietetic studies in arthritis are reported in this way it will be possible to correlate the work of the various investigators, and we may hope for more rapid progress in this one phase of the arthritic problem.

H. GORDON MACLEAN, M.D. (230 Grand Avenue, Oakland).—The grouping of arthritis presented by Doctor Peers is a very workable one. It is very similar to the older grouping of atrophic, hypertrophic, and mixed types of arthritis. His fourth group of arthralgias covers nondescript types, many of which, however, as times goes by will fit into one of the first three groups.

The use of the sedimentation test indicates that Group One is markedly related to infection, and that Group Two is not so closely related to infection.

His findings in regard to basal metabolic rate are very similar to those by Boothby in 1922, in which 90 per cent of all arthritics fitted into the basal metabolic readings of minus fifteen to plus fifteen. He has shown that the tendency in all groups concerned is toward a slightly minus reading, and that this is not at all typical of arthritis.

The sugar tolerance test, using the one-hour two-dose method, still continues to bring out the fact that there is a disturbed carbohydrate metabolism in arthritics, but here, again, this is not any real characteristic of arthritis.

All of the suggestions given lead one to the conclusion that arthritis is a constitutional disease, with many factors being the cause. It is necessary to treat each arthritc individually. If he is underweight, the use of insulin to bring up his weight is highly beneficial, as in other individuals who are undernourished. Also, if he is overweight it is necessary to have that weight reduced. Diet, in other words, should be suited to the individuals: high caloric for the undernourished and low caloric for the overnourished.

Removal of infection is necessary in all types of arthritis when it is found. Medication at the present time is only of value for the relief of symptoms.

Rest would be ideal for most arthritics, and some day, perhaps, we can treat them in the same way that we today treat the tuberculous individual, getting the disease in hand early and not late, as is our custom at the present time. The difference between the treatment of tuberculosis and the treatment of arthritis today is that the tuberculosis individual gives his entire time to taking care of his disease, while most arthritic individuals continue working and pay attention to their treatment only as a side issue.

The need for well-regulated institutional care of arthritis over a long period of time is very great. Good results will be obtained when we have the combined efforts of the internist, the orthopedist, the physiotherapist, and the occupational therapist, all working as one.

HYPERPYREXIA: AS AN ADJUNCT IN THE TREATMENT OF CEREBROSPINAL AND KAHN-FAST SYPHILIS*

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DISCUSSION *by Rodney F. Atsatt, M. D., Santa Barbara; Norman N. Epstein, M. D., San Francisco; Ross Moore, M. D., Los Angeles.*

ROSENBLUM of Odessa, in 1876, was the first to inoculate, with malaria, patients suffering with general paresis and other mental diseases. In 1878 Oks translated this paper into German.[1] Wagner Von Jauregg, while in Constantinople, thirty years later, popularized the malaria treatment of neurosyphilis.[2]

ARTIFICIAL FEVER AND MALARIA TREATMENT

Artificial fever production in recent years has superseded the malaria treatment for three reasons:

* Read before the Dermatology and Syphilology Section of the California Medical Association at the sixty-fifth annual session, Coronado, May 25 to 28, 1936.

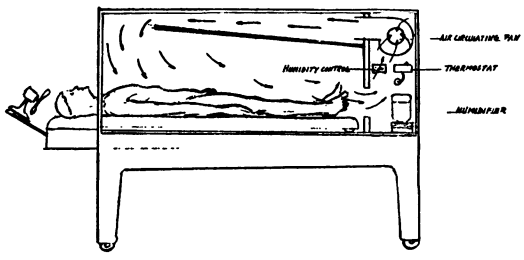

Fig. 1

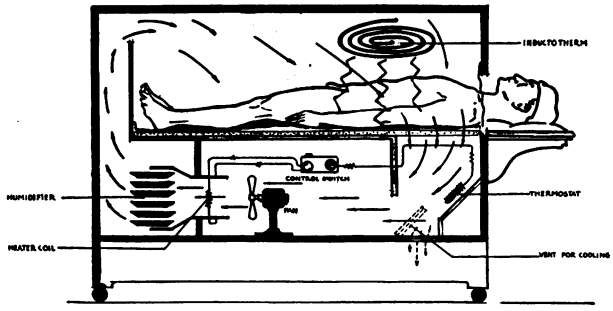

Fig. 2

Fig. 1.—Diagram of Kittering Air-conditioned cabinet as described by Simpson, Desjardins and others. Note the humidifier, thermostat, air circulating fan, humidity control and fan that blows air on head and face. Temperature in the cabinet ranges from 150 to 160 degrees Fahrenheit and humidity 50 to 75 per cent.

Fig. 2.—Kimble cabinet. Note thermostat control switch, heater coil, humidifier and the heavy insulated coil of the inductotherm suspended above the patient's chest and abdomen. Temperature in this cabinet at all times is 100 degrees Fahrenheit. Fever is generated in the patient solely by magnetic waves from the suspended coil entering the patient's body.

1. The former is twice as effective, curing 65 per cent of 742 cases.

2. The mortality from malaria therapy is from seven to ten times as high as with artificial fever heat. In the literature there are eighteen deaths with the treatment of 700 patients with hyperpyrexia, whereas the malaria therapy death rate is 10 to 30 per cent.[3] We three have treated over 800 patients in the past six years, with no deaths. Neymann of Chicago has treated over 1,000 cases by this method, and his death rate is nil. Desjardins of Mayo's treated 362 patients, with one death.

3. When a syphilitic is infected with malaria there are two diseases to treat instead of one. Other superimposed infections have also been recommended, but the aim in the past five years is to get away from the production of fever by such infectious agents as rat-bite fever, relapsing fever, and malaria.

DIATHERMY

In previous reports by Potter[4] and Redewill,[5] over 200 cases of neurosyphilis and Kahn-fast cases were described, having been treated with diathermy with very successful results. However, there are several disadvantages with the use of this modality, such as the binding of patients with large electrodes, packing around the patient rubber sheets and blankets, all of which add greatly to their discomfort. Kettering and Sittler[6] of the General Motors Company brought out an air-conditioned cabinet with the use of ultra-high frequency electric currents applied by means of condenser discharges of a modified short-wave radio transmitter. They pointed out that the air-conditioned cabinet was to dissipate sweat as it collected on the skin surface, and to prevent arcing and burning of the skin as a result of concentration of short radio waves in the drops of sweat. Accidentally, they discovered that their cabinet would generate fever in a patient just about as satisfactorily with the air-conditioned apparatus going and without the short-wave radiation. Since then they have used solely the air-conditioned cabinet to produce in patients fever ranging from 105 to 107 degrees Fahrenheit (Figure 1). They have lent fifty-five of these units to medical research centers to produce hyperpyrexia in all types of acute and chronic infectious cases, and some of the results have been reported. (Simpson[7] and Desjardins.[8])

The great drawback in the use of cabinets that attain a temperature of 160 degrees Fahrenheit, thereby attempting to raise a patient's temperature with heat applied from without the body (which is also the same principle that is used through hot-water baths, electric light and infra-red cabinets), is that the patients so treated have a pulse rate twenty to thirty beats to the minute higher than those patients that are treated by modalities such as diathermy and electromagnetic currents that generate the heat within the body.[9] Therefore, as can naturally be expected, patients that are treated for five or six hours with the unnatural method of attempting to force heat into the body from without show a more frequent tendency of displaying symptoms of heat collapse. This is probably due to the severe strain placed on the sympathetic nervous system, when such heat is applied to the whole skin surface area. When fever heat is developed by electric magnetic current, such as the inductotherm generates, and the patient lies in an air-conditioned cabinet for six to nine hours, with a temperature of the cabinet of not over 102 degrees Fahrenheit, the patient is not only a great deal more comfortable, even with a temperature of from 105 to 107 degrees Fahrenheit, but shows no tendency to have any of the symptoms tending toward the ultimate heat collapse. It would seem, therefore, that by far the more preferable type of hyperpyrexia cabinet to use would be the latter type, which is known as the Kimble (Figures 2 and 3). We three presenting this paper have been fortunate in being able to use such Kimble cabinets in Bremerton and San Francisco in treating syphilis and gonorrhea infection and their complications.

TWO METHODS OF PRODUCING FEVER HEAT

All the different methods of producing fever heat can be divided into two classes: in the first, the environmental temperature of the media about the patient is maintained at a level higher than the internal temperature of the patient;[10,11,12] and in the second, there is a group of applications in

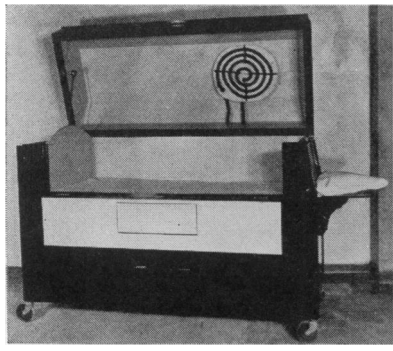

Fig. 3

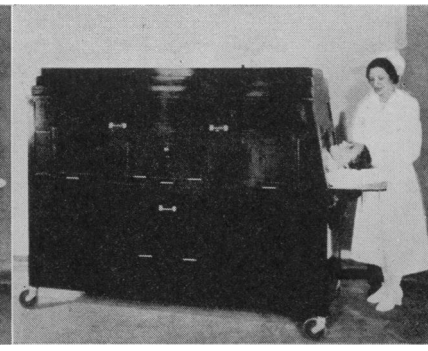

Fig. 4

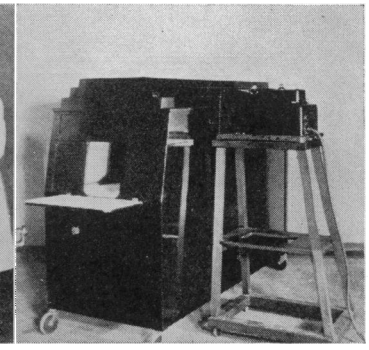

Fig. 5

Fig. 3.—Kimble cabinet (General Electric) with the top lifted and side panel dropped down. The patient lies on sponge rubber, 1½ inches thick covered with white rubber cloth and terry cloth. Note the inductotherm coil attached to inside of top. When the lid is lowered, the coil can be lowered or raised at will within the proper distance of the patient's chest and abdomen.

Fig. 4.—Kimble cabinet, side view when closed and holding a patient. Note panel doors. Upper door can be opened clear across the cabinet or just a small door can be opened for use in waiting on the patient. Lower door opens into heating mechanism that can be easily regulated from without.

Fig. 5.—Kimble cabinet, end view showing inductotherm attached. This inductotherm is attached to the suspended coil shown in Fig. 3.

which the temperature of the atmosphere about the patient is maintained at a level lower than the internal temperature of the patient. The first type includes hot baths, steam, electric light, infra-red and hot-air cabinets; the latter group includes diathermy, short wave and ultra-short wave bipolar modalities and electromagnetic radiation. This last modality is applied either in specially constructed blankets or in cabinets with the magnetic coil suspended above the patient.

For the past seventy-five years factors have been used to raise the temperature of the body with mud baths, hot-water baths, electric-light cabinets, steam cabinets, infra-red cabinets, and others. Where the temperature has been raised to not over 102 degrees, probably no untoward results have been noticed, if the applications have been applied for short periods of time. But in modern hyperpyrexia, with the raising of the temperature from 104 to 107 degrees Fahrenheit for a period of five or six hours, this method of raising the temperature is not only inadequate, but dangerous, because many patients so subjected show signs of heat collapse. Where heat is thrown into the body from the outside, the striking thing that is noticed is that the patient's pulse is, as said above, twenty to thirty beats a minute more rapid than when the heat is induced within the body.

As to the electromagnetic cabinet method, how near does it simulate nature's own means of producing heat? Does it violate any physiologic laws? Is it applicable to the sick and feeble patient? The answer to these questions are obvious as one becomes acquainted with the method.

BIOPHYSICS OF NEW CABINET THERAPY (KIMBLE) [13]

How the electro cabinet works is briefly as follows: The patient is placed in a specially designed cabinet. The temperature of the air in this cabinet is maintained automatically between 99 and 100 degrees Fahrenheit. The relative humidity approaches 70 per cent.

From a special adjustable coil suspended above the patient's chest and abdomen, a high-frequency magnetic wave is projected through the body tissues (Figures 4, 5, and 6). Due to their biophysical properties, these waves change into heat waves in the more conductive tissues of the body. More conductive tissues are the blood, vascular organs, and the muscles. Within one to two hours the internal temperature of the patient is elevated 3 to 5 degrees Fahrenheit. The magnetic wave is then shut off. From this point on the artificial fever is similar to a natural fever. In other words, we have replaced only the chill of a natural fever with the induction and release of artificial heat within the body by a biophysical agency.

It stimulates a natural fever in the following ways:

1. The internal temperature of the patient is always higher than the environmental temperature.

2. Heat at all times can leave the skin by radiation and conduction. (The skin is never forced to absorb heat.)

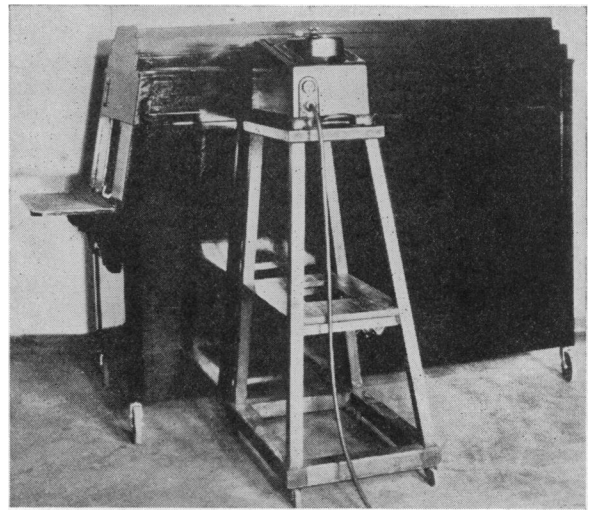

Fig. 6.—Kimble cabinet, lateral view with inductotherm attached and hooked up to line switch.

3. Some heat is lost by evaporation of perspiration (relative humidity 70 per cent).

4. The body produces its own energy for the continuation and further elevation of the fever. (By acceleration of metabolism.)

These factors, together with other features incorporated within the cabinet, such as a soft mattress, intermittent circulation of air, etc., keep the patient comfortable. If a patient is comfortable he is not irritable and restless. This permits the use of a small amount of sedatives.

There are practically no contra-indications for the magnetic cabinet type of thermal therapy. One caution is mentioned, namely, that every patient should be examined thoroughly in order to ascertain that no other intercurrent disease is present for which a fever would be contra-indicated.

TECHNIQUE

Preparation of Patient for Hyperpyrexia.— A careful physical examination should be made of each patient previous to treatment, including general physical examination, basal metabolism, electrocardiograph, blood pressure, blood and spinal Wassermann. Two following tests are especially useful in evaluating the behavior of the circulatory and nervous systems to hyperpyrexia: (1) Exercise test, to determine how quickly the pulse will return to its normal rate after exercise. (2) Cold pressor test[14] for early diagnosis of essential hypertension.

Sedatives. — Of the numerous sedatives advocated, we find the best ones to administer previous to and during hyperpyrexia treatment are: Two teaspoonfuls of pentabromids in water by mouth, and one-half grain of codein phosphate hypodermically one-half hour before beginning treatment. Repeat the codein during treatment for restlessness that may occur in the first hour of treatment. We find the barbiturates are somewhat depressing to the circulatory system, that morphin may be the direct cause of apnea during treatment, and scopolamin or hyoscin have a tendency, especially in neurosyphilis cases, to render the patients excitable and even mildly maniacal and difficult to control.

Stimulants.—Outstanding stimulants for weak pulse are caffein sodium benzoate, coramin (ampoules), hot coffee and carbogen (carbon dioxid 5 per cent, oxygen 95 per cent), inhalations for patients with disturbed respiration. In pending heat collapse, adrenalin is contra-indicated because, as said above, it contracts the superficial capillaries, thus retarding loss of heat through the skin.

COURSE OF TREATMENT

No two patients behave just alike under treatment, however, as Clarence A. Neyman says, concerning the new electromagnetic induction, creating heat within the patient, rather than applying heat from without, as followed by other forms of treatment, "one can maintain temperatures of 41, or even 42, degrees centigrade, or up to 106 degrees Fahrenheit, or five, six, seven or eight hours with comparative ease and without taking a great risk." Neyman, in discussing Desjardin's paper on fever therapy,[15] says: "We use electromagnetic induction now in combination with the cabinet, where the temperature of the cabinet never rises above 105 degrees Fahrenheit. The cabinet will not in itself produce fever at all, but simply serves as a sort of blanket in which the patient can move freely. With this sort of apparatus, patients in advanced stages of diabetes, with organic heart disease, with advanced arteriosclerosis, with diseases of the liver and the like, have been and are being treated, and our death rate remains virtually nil in over one thousand cases."

ACUTE SYPHILIS DOES NOT RESPOND READILY TO HYPERPYREXIA

What we mean by this is that it requires many very high fever heat treatments to kill the spirochete in the human body so that the patient is actually rid of the acute syphilitic infection, whereas in the chronic, and especially the neurosyphilitic, comparatively low fever heat will produce remarkable results—symptomatically speaking. And especially in syphilitic aortitis cases does fever heat produce striking results.

OTHER OBSERVATIONS

A specially trained nurse should be in constant attendance during a fever-heat treatment. There are scores of important items to be carefully looked after while giving such a treatment. To overlook any of them may invite disaster. We have not the space here to write down all the "Do's and Don'ts," nor can one become skilled in giving fever heat by reading a list of warnings. A fever-heat nurse is in the same category as an anesthetist, and must be actually trained under skilled hands. Simpson et al.[16] loaned out over fifty Kittering machines to various clinics, as we mentioned above, but they would not allow any of their machines to be used until nurses who were to handle the cabinets were trained for six months in the Dayton hospital.

LABORATORY FINDINGS

During fever heat a leukocytosis occurs; there is a drop in the sedimentation-test reading; during fever therapy the systolic pressure drops 20 to 30 points, and the diastolic during height of the fever often drops to zero. There is a great loss of chlorids which have to be replaced by giving normal salt solution by mouth. Because of the piling up of sodium in the system there is a tendency to an alkalosis; therefore, fruit juices are contra-indicated during treatment.

REPORT OF CASES

CASE 1.—J. H. M. This patient has had a Kahn-fast blood and spine for twenty-two years. He has had innumerable courses of neoarsphenamin, tryparsamid, bismuth, and iodids. All previous treatment has been unable to reduce his serology, and aseptic fever is the last resort. The patient went through his first two treatments without incident, maintaining a high temperature of 105 degrees and over for three hours. A temperature was reached of 105.4 degrees.

His basal metabolism was minus 19m, and one-quarter grain thyroid was given to correct this; the same to be taken twice daily. Following the third treatment, his Kahn reaction was negative.

October 10, 1935—The patient states that he has a feeling of gusto and vigor, and that his well-being is sustained. Kahn is negative after the third treatment. Eating well and sleeping well.

October 16, 1935—The patient's fourth treatment. Came in feeling fine. Temperature was not elevated so high this time.

Treatment well sustained and patient comfortable. The blood Kahn taken following treatment returned negative. Laboratory reported that there was no doubt about it.

* * *

CASE 2.—K. The patient has had chronic tertiary lues for years. Came to us complaining of shortness of breath and pain in the chest, around the region of the aortic interspace. X-ray showed a definite widening of the aortic arch. A diagnosis of vascular syphilis with aortitis was made. The patient has had three years' treatment with neoarsphenamin, mercury, and bismuth. He continued to complain of pain and shortness of breath on exertion. High temperature treatment was instituted today. The patient went through his first treatment without any trouble whatever.

October 13, 1935—The patient states that since his first treatment he has lost his rheumatic pains in shoulders and legs (tabetic ?). He feels generally improved and does not become so short of breath. He passed through this treatment without discomfort, but began to complain of pain over his heart toward the end. He was given HMc No. 2 for restlessness. It was found that temperature could be raised provided the humidity was maintained around 38 to 40 per cent, and with less dry-bulb heat.

October 14, 1935—The patient feels a little weak and shaky today, and complained of pain again in his shoulder (right). His occupation may have something to do with this, as he is compelled to work overhead. Otherwise he feels well.

UNSKILLED HYPERPYREXIA TREATMENT IS DANGEROUS

Although the great majority of the cases treated in the electromagnetic cabinet progress very satisfactorily with no untoward affects during treatment, however, anyone doing considerable amount of hyperpyrexia work is bound to get hold of a very troublesome case once in a while, even demanding the best skill of the doctor and nurse to pull the patient safely through the treatment, as the following will illustrate:

CASE 3.—H. R. B. Age, 52. Diagnosis: Tabes, optic atrophy and syphilitic aortitis with myocarditis and severe anemia. The patient was treated on April 16, 1935, at Bremerton, Washington, by two of us. 5:15 p. m.—Temperature, 98.8; pulse, 72. Temperature of cabinet through treatment ranged from 100 to 104 degrees Fahrenheit. Inductotherm cut off. Time, 7:00 p. m.—Temperature, 105.4; pulse, 120. Inductotherm cut off. Time, 7:45 p. m.—Temperature, 105.2; pulse, 118. Inductotherm cut on. Time, 8:15 p. m.—Temperature, 107.2; pulse, 126. Inductotherm cut off. From this point the temperature rose in one hour to 108. Pulse, 158; temperature continued increasing slightly and at 11:00 p. m.; 108.8 pulse; 170; 1,000 cubic centimeters of normal saline solution intravenously. Carbogen gas inhalation given constantly. Pulse thin-running and irregular. Caffein, 7½ grains, given. Patient cyanotic around the ears, hands, and feet. Ghastly pallor about the face, reflexes nil. 12:30 a. m.—One thousand normal saline solution, intravenously. 12:45 a. m.—Temperature, 108; pulse, 160. Beginning violent seizures and convulsions of feet and hands; then arms and neck; then of whole body—the same lasting about twenty minutes. 1:30 a. m.—Temperature, 106.8; pulse, 140. One thousand normal saline solution intravenously. Convulsions beginning to lessen in severity. 2:15 a. m.—Temperature, 105.2; pulse, 132. Pulse very feeble. Caffein, 7½ grains, given. 2:45 a. m.—Temperature, 104; pulse, 132. Patient cooling down. Ice water to legs and arms. 3:15 a. m.—Temperature, 103.2; pulse, 130. Pupillary function returning. Patient very restless. 4 a. m.—Temperature, 102; pulse, 124. Involuntary feces and urine; five movements in one hour. 4:30 a. m.—Temperature, 101.2; pulse, 120. Patient moaning and tossing about a great deal. 5 a. m.—Temperature, 101; pulse, 120. Patient beginning to regain consciousness. From 5 a. m. to 10 a. m. the patient gradually cooled to normal. Mentality was hazy. The patient had severe pain in lower back. Blood pressure throughout the treatment averaged 92 systolic and 30 diastolic.

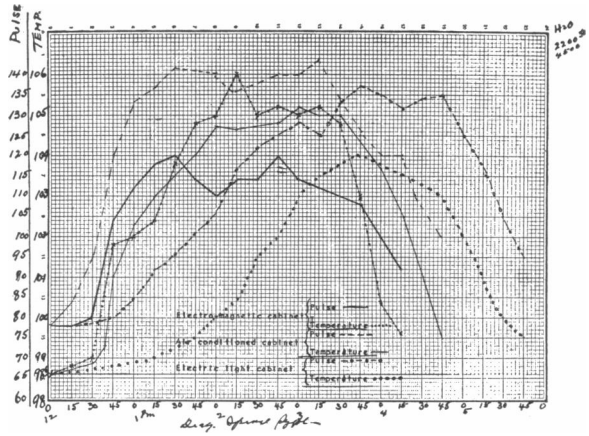

Fig. 7.—Temperature and pulse curves of same patient given treatment in three kinds of cabinets. Note in the Electro Magnetic Cabinet the temperature curve (marked in fine dots and crosses) runs much higher than the pulse (heavy black line). In the air-conditioned cabinet the pulse (in dashes) runs much higher than the fever curve (fine line). Note that in the electric high cabinet the pulse and temperature start much slower with the pulse (in dots and dashes) running much higher than the fever curve (in fine circles).

COMPARISON OF TREATMENTS IN THREE TYPES OF CABINETS

Treating patients in electric light, air-conditioned and electromagnetic cabinets, the comparable temperature and pulse curve are shown graphically in chart (Figure 7). The disadvantage of electric-light cabinet is that it takes too long to produce adequate fever, so that the patient is all tired out, restless, and nervous before the height of the temperature is reached. Secondly, throwing this type of heat into the body from without produces an undue amount of weakness in the patient, manifested by unusual rapid pulse, and the patient leaves the cabinet in a much more exhausted condition. Patients treated in the air-conditioned cabinet, with the temperature of the cabinet ranging from 140 to 160 degrees Fahrenheit, the required fever is arrived at in about the same time as with the electromagnetic cabinet, but the average pulse rate in a series of cases was twenty to thirty beats faster per minute in the former types of cabinet as compared with the electromagnetic type. Patients emerge from treatments in the Kimble (electromagnetic) in a far better condition, stronger, and more contented than those who are treated in either of the other two types of hyperpyrexia equipment. Another advantage of the electromagnetic type of cabinet is that it cuts short the duration and number of treatments required to obtain therapeutic results.

RESULTS OF TREATMENTS

Kahn-fast cases: number, 107; cured, 88. Kahn two plus, 8 cases. Unimproved, 8 cases. Cerebral spinal fluid positive, 48 cases, with high cell count, globulin present in decided amount, and high

Syphilis Treated With Hyperpyrexia and Chemotherapy

Type of Cases	Number of Cases	Blood Test Before Treatment Started	Blood Test After Treatment	Number of Fever Treatments	Type of Treatment Chemotherapy	Spinal Fluid Findings	Remarks
Kahn fast	82	49– 4 26– 3 7– 2	51 neg. 5– 4 8– 3 9– 2 9– 1	36 had 5 26 had 4 10 had 3 Temp. 105-107.8 for av. 5 hours	Sod. thiosulph. 3 injections Bismuth average 36 injections Proto-iodid pills gr. ⅛ t. i. d.	Negative	Acute syphilis requires higher fever and longer treatments than chronic syphilis.
Spinal fluid positive.	17	1– 4 2– 3 4– 1 10– neg.	2– 2 15– neg.	None	Weekly spinal drainage (2 millimeters). Tryparsamid bi-weekly; bismuth; iodids. Bismarsen .2 gm. Drugs given to tolerance.	Before treatment 10– 4; 3– 2; 4– 2 After treatment 5–3; 1–2; 11 negative.	All these cases showed positive globulin. Increase cell count and larger chlorid of gold curves. Five have relapsed since treatment stopped.
Cerebro-spinal syphilis.	23	15–neg. 5–3 3–2 or doubtful	20– neg. 1 – 3 2 – 2	15– 7 F. Temperature 104 to 107.8 for 5 hours. Five received five treatments. 104 to 107 average 5 hours. One had partial collapse. Treatment discontinued. Two received three treatments. 103 to 104 average 5 hours.	Tryparsamid Bismuth Spinal drainage Drugs pushed to tolerance Bismarsen .2 gm. (Bismuth-arsphenamin—sulphonate). Given intramuscularly.	Spinal fluid before 5 – 4 16 – 3 2 – 2 All typical chlorid of gold curves c globulin and marked cell count.	Spinal fluid after 20 – negative 1 – 3 2 – 1 or doubtful All chlorid of gold curves improved or negative except those that did not finish treatment. All clinical symptoms improved.
		Nervous Symptoms 20 positive showings. 1 case hemolytic. loss sphincter control—completely cured, C negative blood and spinal fluid. Began c 4 blood 3 spine. Had 7 fever treatments and chemotherapy. All knee-jerks ab. 3 positive Babinski. 6 eye changes. 2 optic affections arrested.					

Results of Hyperpyrexia Treatment

	Number of Treatments	Time	Type	Adjunct to
1. Syphilis (all stages)	10 to 30 (10 in series)	1 a week to 2 a week	104 to 106.5 for 6 hours	Ars. and bis.
2. Chronic arthritis (nonspecific) 1. Atrophic 2. Hypertrophic 3. Mixed	10 to 30 continuous	1 a week to 1 every 2 weeks	102.5 to 103 for 6 hours	Vitamin D concen. 200,000 u. daily
3. Arthritis G. C.	3 to 5	1 a week	105 for 5 hours	Vacc. (Corbus-berry)
4. Acute articular rheumatism	3 to 5	2 a week	105 for 5 hours	Salicylates
5. Subacute rheumatism Arthritis	3 to 7	1 a week	104 for 5 hours	Salicylates
6. G. C. salph.	3	1 a week	105 for 5 hours	Vacc. (Corbus-berry)
7. G. C. prostatic complicated	5 to 7	1 a week	105 for 6 hours	Vacc. (Corbus-berry)
8. Acute G. C. Male or female (No complication) Preferably start first day of discharge	3 to 5	2 a week 1 q 4 days	105 to 106.5 for 6 hours	Vacc. (Corbus-berry)
9. Asthma	3 to 4	1 a week or 1 q 10 days	104.5 for 6 hours	Ca. ionization of nose Vitamin D concen. 50 to 200,000 u. daily
10. Hay fever	3 to 5	1 q 10 days	104 for 5 hours	Preseasonal ca. ionization 200,000 u. daily
11. Angina-neurotic edema, etc.	1 or 2	1 a week	105 for 5 hours	Restriction of fluids after Rx.
12. Chorea	3 to 4	1 a week	103.5 to 104 for 6 hours	Restriction of fluids after Rx.
13. Parkinson (Early)	10 to 30	1 a week	104.5 for 6 hours	Vitamin D concen. 200,000 u. daily

chlorid of gold curve. Average number of fever-heat treatments, 14. Gold chlorid curve, negative, 28. Improvement in cell count, globulin, and gold curve, 9. No improvement or discontinued treatment, 11. Neurosyphilis, 45 cases. All patients in this group who completed sufficient number of treatments were markedly improved from standpoint of manifested symptoms. Gold chlorid curve became negative in 18, the curve markedly lowered in 13. Slight improvement, 8. No improvement, 6. (Figure 8.)

CHEMOTHERAPY

In practically all of these cases, active treatment with bismuth, arsenic and iodid was followed. Indeed, tryparsamid three-gram doses, bismuth salicylate, and iodobismuthol were often pushed to tolerance. It has not appeared that it in any way affected the course of the patient's progress while giving the fever-heat treatment to also give the arsenic and bismuth medication directly before the hyperpyrexia, or in between the series. However, it has seemed unwise to us to burden the patient who is undergoing high-fever therapeusis, with heavy metals while he is under the influence of sedatives. Therefore, our practice has been to give the arsenic and bismuth between hyperpyrexia treatments. (Figure 9.)

CONCLUSIONS

1. Physical agents used for the production of artificial fever can be grouped in two classes: (*a*) Cabinets operating at temperatures lower than the temperature of the patient. (*b*) Cabinets operating at temperatures higher than the patient's fever.

2. With electromagnetic induction stimulating fever in a patient in a cabinet that has a temperature of only 100 degrees Fahrenheit, the pulse is twenty to thirty beats slower per minute, as compared with treatment in light and air-conditioned cabinets. With this magnetic induction type of treatment, the patient receives more rapid and satisfying therapetic results with less danger of heat collapse and shock.

3. A careful examination should be made of all patients that are to undergo fever-heat therapy, and only doctors and nurses who are thoroughly conversant with this type of therapy should administer such treatment.

4. Photographs of different types of cabinets have been presented, with charts showing comparative fever and pulse curves.

5. Acute syphilis responds stubbornly to fever heat, whereas all types of chronic cases, when given a sufficient series of hyperpyrexia treatments demonstrate remarkable improvement in over 70 per cent of the cases.

6. Active chemotherapy is administered in all chronic syphilitic cases along with fever-heat treatments.

7. With electromagnetic induction in the production of fever-heat treatment, the syphilologist had added greatly to his armamentarium of therapeusis.

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DISCUSSION

RODNEY F. ATSATT, M. D. (1421 State Street, Santa Barbara).—The efficacy of the treatment of cerebrospinal syphilis through fever therapy produced by electrical means is so generally accepted as to need very little discussion. It is true that some authors still feel that there is an unexplainable malaria "toxin" which is specific for the treponema; but in most centers the artificial fevers are produced by electricity.

The problem is how to convert electricity into body heat or fever is a complicated one. Certain it is that several factors must be considered. The primary one is safety, as there must be no danger of burns either from contact or from eddy currents. The second factor is the ability to do exactly what you want in the process of heating; in other words facility, which will allow you to hold a predetermined temperature within a two-tenths degree range. The third factor is simplicity, which connotes the absence of all complicated mechanisms, and, fourth, the apparatus should be inexpensive.

Doctor Redewill's paper describes an ingenious mechanism for producing fever which depends upon the induction of an electromagnetic field. Judging it from our announced criteria, we think that perhaps the simple conditioned air cabinet may be superior and for these reasons. With a humidity of 70 per cent there will be little evaporation of perspiration, which means that droplets of salty water will be formed on the skin, and these will collect the eddy currents present in the electrical field, often to the discomfort and even danger to the patient. The facility of this mechanism is such that the flat plateau fever curves, where the temperature fluctuation is within a small range, are not often produced. (Incidentally, it may be noted that most conditioned air cabinets are operated at a temperature of from 120 to 125 degrees Fahrenheit, instead of 140 to 160 degrees as suggested.) In comparing the two devices as to simplicity and cost, the hot, moist-air cabinet needs nothing for its operation that cannot be purchased in an ordinary electrical store, while the Kimble

method requires a source of electromagnetic induction currents necessitating a special mechanism.

However, entirely aside from this discussion as to method, Doctor Redewill is to be congratulated on a splendid piece of work on these Kahn-fast cases of syphilis. His reported results are excellent.

NORMAN N. EPSTEIN, M. D. (450 Sutter Street, San Francisco).—The authors are to be complimented for their interesting contribution to the subject of artificial fever therapy. A study of the different physical methods which have been introduced for the production of an artificial fever during the past seven years shows a great tendency toward the adoption of simple procedures for this purpose. There is no definite proof to show that a fever which is induced by short-wave diathermy, or radiothermy or other electrical means such as the inductotherm, is safer or more beneficial than the artificial fever which is produced by placing the patient in an air-conditioned cabinet and electric blanket, or by wrapping him in woolen blankets plus the addition of an external source of heat.

In all of these modalities a most important factor in the production of the artificial fever is the prevention of radiation of heat from the body surface.

I wish to add my word of caution to those of the authors that great care must be exercised in the administration of artificial fever therapy. This attitude is expressed in practically every recent communication in the literature on this subject. Regardless of the method used to induce artificial fever certain serious reactions may occur, the most dangerous being a sudden rise in temperature to an extremely high point, such as from 107.5 to 110 degrees Fahrenheit. When this occurs death may ensue, although as a rule the immediate use of measures to reduce the temperature will avert this casualty. This reaction can be prevented only where the person conducting the treatment is highly trained and thoroughly experienced in the modality being used. Secondary rises in temperature several hours after the treatment had been discontinued may also occur and must be watched for.

The therapeutic results obtained by the authors in the treatment of cerebrospinal syphilis and Kahn-fast syphilis by the combined use of chemotherapy and artificial fever therapy are striking. There is no doubt but that artificial fever therapy is a most valuable adjunct in these types of syphilis, particularly neurosyphilis.

Space does not permit of further discussion, but in closing I wish to emphasize the fact that artificial fever therapy should be a hospital procedure under the direction of a highly trained personnel. Under these circumstances artificial fever may be employed safely, and is a valuable adjunct in the treatment of neurosyphilis.

ROSS MOORE, M. D. (1930 Wilshire Boulevard, Los Angeles).—Doctor Redewill's paper details three points which mark an advance in thinking concerning thermotherapy. First, he describes a method of treatment which appears to be safer than other electrofever methods; second, he shows that electrofever can be produced from within outward very easily without direct contact electrodes; third, the method he uses leaves the patient more comfortable than most other procedures—three valuable advances in treatment by means of artificial fever.

Since the paper is so well rounded out and complete, I shall confine myself to suggesting two additional points. The first of these relates to the use of fever treatment in late syphilis, including, under that term, all the sluggish manifestations of this disease. A considerable comparative experience leads me to conclude that electrically induced fever is not by any means the equal of malarial treatment. For, in my opinion, there is a certain biologic or specific reaction between plasmodium and spirochete, or between the products of their activity. This reaction does as much, perhaps even more than the coincident fever, to bring about recovery. Of course, there is room for sharp argument here.

The second point develops out of the more or less restricted type of cases which comes under my control, so-called "toxic cases" with sluggish appearing, nontransparent skins and other evidence of slowed or disturbed metabolism. Such cases frequently have a somewhat low-temperature range. In a large percentage of these cases a few fever treatments with mouth temperature, being pushed up only three or four degrees above starting point, are extremely helpful in clearing away toxic metabolites and eliminating symptoms. Such treatments are easily given, even in the home bathtub; and if properly supervised they are both devoid of danger to the patient and free from unpleasantness. I recommend a study of low fevers, as well as hyperpyrexias, to physicians who have among their patients examples of metabolic sluggishness and toxic metabolites.

CANCER CLINICS IN SMALL HOSPITALS*

By ZERA E. BOLIN, M.D.
San Francisco

DISCUSSION *by Charles A. Dukes, M. D., Oakland; Gertrude Moore, M. D., Oakland; Orville N. Meland, M. D., Los Angeles.*

THE cancer situation in California is causing comment from the rest of the United States. According to statistics from the life insurance companies, the death rate from cancer in California is apparently rapidly increasing. The situation in San Francisco is especially alarming in that the death rate from cancer is one of the highest in the whole United States, there being probably only one city which exceeds San Francisco's death rate.

CANCER COMMISSION OF THE CALIFORNIA MEDICAL ASSOCIATION

This situation is being combated by the California Medical Association in various ways. Several years ago there was formed the Cancer Commission of the State Society. This Commission, under able leadership, has made considerable progress. The progress so far has been along the line of professional education. The Commission has sponsored conferences of pathologists and radiologists before each yearly meeting of the Association. It has collected, and published in book form, the consensus of over four hundred doctors in California dealing with cancer. It has sponsored cancer meetings in practically every county society.

THE GENERAL PRACTITIONER IS THE KEY MAN IN CANCER WORK

The need for this professional education is not as apparent at first sight as will be shown later. The number of cases of cancer seen yearly by the general practitioner in the smaller communities averages two a year. This number of cases of cancer does not allow the key man, the general practitioner, in the cancer situation to obtain a proper method of approach to diagnosis and treatment. The mental bewilderment of the man who first sees cancer is partly responsible for the unwarranted delay which occurs. In a large series of cases this delay averages five months before the patient seeks medical care and, strangely enough, it averages five months after the patient

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* From the Department of Pathology, Mary's Help Hospital, San Francisco.

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